

Histopathological Spectrum of Splenectomy Specimens: A Six-Year Retrospective Study

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Abstract

Background: The spleen plays a vital role in blood filtration and immune function but can be affected by a range of conditions requiring surgical removal. This study explores the histopathological findings in splenectomy specimens received at our institute and examines how these findings relate to clinical diagnosis.

Methods: We conducted a retrospective study over six years (2016–2021) at the Department of Pathology, SDM College of Medical Sciences and Hospital, Karnataka. A total of 60 splenectomy specimens were analyzed through detailed gross and microscopic examination, with clinical data retrieved from medical records.

Results: Of the 60 patients, 36 were male and 24 were female, with the most common age group being 31–40 years. The leading reason for splenectomy was blunt abdominal trauma (40%), followed by blood disorders like thalassemia intermedia (11.7%) and hypersplenism (8.3%). Histopathological examination most frequently revealed traumatic laceration (38.3%) and chronic venous congestion (36.7%), often linked to conditions like thalassemia and portal hypertension. Less common findings included splenic hamartomas, lymphangiomas, and Non-Hodgkin's lymphoma. Cystic lesions were identified in 10% of cases, including pseudocysts, mesothelial cysts, and epithelial cysts.

Conclusion: Although splenectomy is not a routine procedure, its histopathological analysis provides valuable insights into underlying diseases. This study highlights trauma as the most common reason for spleen removal, followed by hematological and vascular disorders. Understanding these patterns can help improve diagnosis and patient management.

Keywords: Splenectomy; traumatic laceration; chronic venous congestion

Introduction

The spleen was considered by Galen as an organ full of mystery [1]. The spleen is the largest secondary lymphoid organ in the body which lies in the upper quadrant of the abdominal cavity between the fundus of the stomach and the diaphragm, relatively below the left costal margin, between the 9th and 11th ribs [2]. It is soft, friable, dark purple with a smooth surface. It measures 12x7x3 cm and weighs on average 150 gms [3]. It arises from mesodermal tissue and it is first identified in the human embryo during the 5th week of gestation [4]. The spleen has an anterior and posterior segment and is situated on the upper pole of the left kidney and on the tail of the pancreas. It has 2 surfaces, the visceral and diaphragmatic, and has 3 borders, the superior, inferior, and intermediate [2].

The spleen is composed of two morphologically distinct units, the red pulp and white pulp. It lacks afferent lymphatic vessels and is dependent on systemic circulation. The spleen is surrounded by a capsule which is made up of elastic fibers, dense fibrous tissue, smooth muscle fibers, and outermost mesothelial cells [5].

The spleen can be a site for various benign and malignant neoplasms and can also be involved in various metabolic and hematologic conditions [6]. The incidence of focal splenic lesions ranges from 0.103 to 0.20%. The malignant lesions in the spleen are rare compared to benign (Benign to malignant lesions ratio 3:1) [7].

Splenectomies are done for hemolytic anemias, immune thrombocytopenic purpura (ITP), tuberculosis, cysts, traumatic rupture, chronic venous congestion, and hypersplenism [8].

Splenectomy is most often performed for therapeutic or palliative reasons when the diagnosis is already known. Its use as a purely diagnostic procedure is relatively uncommon. However, certain clinical scenarios do necessitate splenectomy for establishing a diagnosis, especially when non-invasive methods are inconclusive. This study focuses on the histomorphological evaluation of splenectomy specimens performed either with diagnostic intent or incidentally during other surgeries. Given the limited literature on diagnostic splenectomy, this study aims to highlight its role in uncovering unexpected or clinically significant findings [1].

The aims and objectives of the study are to know the histomorphological features in splenectomy specimens in our institute and to correlate with clinical indications.

Materials and Methods

It is a cross-sectional retrospective study of 6 years duration from January 2016 to December 2021 done in the department of pathology, SDM College of Medical Sciences and Hospital, Shri Dharmasthala Manjunatheshwara University, Dharwad, Karnataka, India. Splenectomy specimens received in the department of pathology were cut into thin slices and kept for overnight fixation in formalin. The specimen is grossed and paraffin blocks were prepared. Sections of 5-micron thickness were taken and subjected for Haematoxylin and Eosin stain. For the purpose of the study, all the cases of splenectomy were noted from the biopsy register. Gross details were noted from the report. Specimen pictures and paraffin blocks were retrieved from the department archives. Microscopic examination was done wherever necessary. Clinical details were obtained from the case files in the medical department. All the cases of splenectomy under the study duration were selected and spleens which were removed as an associated surgery, e.g., as in the case of pancreatectomy, were excluded. Findings were entered in a proforma and data analysis was done using Microsoft Office Excel (2019).

Results

We received 60 specimens of splenectomy during the study period; of these, 36 belonged to male patients and 24 belonged to female patients with the male to female ratio being 1.66:1 (Table 1).

The age of the patients varied from 11 years to 76 years, with a mean age of 35.967 years. There were 6 pediatric cases with an age of 16 and less. The most common age group in the present study is 31 to 40 years with 18 cases (30%) (Table 2).

The most common indication for splenectomy (Table 3) was blunt trauma to the abdomen in 24 (40.00%) of cases followed by thalassemia intermedia in 7 (11.70%) cases. Among the pediatric age group, the most common indication was portal system pathology (3 cases).

The most common diagnosis (Table 4) was traumatic laceration in 23 (38.33%) cases followed by chronic venous congestion in 20 (33.33%) cases. In pediatric cases, the most common diagnosis was chronic venous congestion.

The weight of the spleen ranges from 108 to 460 gm in cases of trauma with a mean weight of 193.04 gm. In non-traumatic cases, the weight ranges from 120 to 2484 gm with a mean weight of 742.78 gm.

There were 24 cases of blunt injury to the abdomen. Traumatic laceration was noted in 23 cases. Most of the cases showed a single laceration in 14 cases (60.86%). The most common site for laceration was the hilum in 13 cases (56.52%). The size of the laceration ranges from 2 cm to 11.5 cm. One case of blunt injury showed only hematoma without laceration.

Chronic venous congestion was the second most common finding in 22 cases. For these cases, a hematological cause was the most common indication. The indications were thalassemia intermedia (7 cases) (31.82%), hypersplenism (4 cases) (18.18%), hereditary spherocytosis (3 cases) (13.67%), portal hypertension (3 cases) (13.64%), portal obstruction (2 cases) (9.09%), ITP (2 cases) (9.09%), and pancreatic pseudocyst (1 case) (4.55%). These cases showed splenomegaly with an increase in weight (mean weight 742.78 gm) and the cut section showed a reddish appearance. Microscopically, there was congestion and enlargement of the red pulp and sinusoidal dilatation. Fibrous thickening of trabeculae and capsule was also seen. Extramedullary hematopoiesis was seen in 2 cases of ITP and 2 cases of hypersplenism. Gamna-Gandy bodies were noted in 3 cases of thalassemia, 1 case of hypersplenism, ITP, and hereditary spherocytosis. Additionally, one case of hereditary spherocytosis also showed omental tuberculosis.

Cystic lesion is seen in 6 cases. Radiologically, 3 cases were diagnosed as hydatid cyst and on pathological examination, they were pseudocyst, mesothelial cyst, and epithelial cyst. There was one case of epithelial cyst with and one pseudocyst

with consistent radiological diagnosis. One case diagnosed as a space-occupying lesion radiologically, turned out to be a pseudocyst.

Splenic infarction was identified histologically in three cases. One of these had been suspected radiologically as infarction, while another presented with clinical features of hypersplenism. The third case was clinically diagnosed as a splenic abscess but revealed infarction on biopsy.

Two cases of hypersplenism were seen in a case of thalassemia. Microscopically, they showed only congested sinusoids.

A splenic abscess was diagnosed clinically in 3 cases; of these, 2 cases were confirmed on biopsy and one showed only infarction without an abscess. One patient with an abscess was diabetic.

A splenic hamartoma was seen in one case. It showed a hilar well-circumscribed nodule of 7x5.5 cm. Microscopically, it showed well-demarcated red pulp with no Malpighian corpuscles and occasional lymphoid elements.

One case of splenic lymphangioma clinically presented with splenomegaly (weight 1182 gm) and radiologically showed features of splenomegaly with congenital lymphatic cysts of the spleen.

One case of splenic Non-Hodgkin's lymphoma clinically presented with pancytopenia and splenomegaly. The spleen was enlarged (weight 1790 gm) and showed grey-white nodular areas. Microscopically, it showed atypical lymphoid cells which were positive for CD45, CD20, and negative for CD3 with a Ki67 of 60%.

Table 1: Sex distribution

	Number	Percentage
Female	24	40.0%
Male	36	60.0%
Total	60	100.0%

Table 2: Age distribution

Age group	Number	Percentage
11-20 years	11	18.33%
21-30 years	13	21.6%
31-40 years	18	30.00%
41-50 years	4	6.67%
51-60 years	10	16.67%
61-70 years	3	5.00%
71-80 years	1	1.67%
Total	60	100.0%

Table 3: Indication for Splenectomy

Indication	Number	Percentage
Blunt injury	24	40.0%
Cystic lesions	6	10.0%
Hereditary spherocytosis	3	5.0%
Hypersplenism	5	8.3%
ITP	2	3.3%
Lymphoma	1	1.7%
Portal hypertension	3	5.0%
Portal obstruction	2	3.3%
Pancreatic pseudocyst	1	1.7%
Splenic abscess	3	5.0%
Splenic hamartoma	1	1.7%
Splenic infarct	1	1.7%
Splenomegaly	1	1.7%
Thalassemia intermediate	7	11.7%
Total	60	100.0%

Table 4: Final diagnosis after Splenectomy

Final Diagnosis	Number	Percentage
Traumatic laceration	23	38.3%
CVC	22	36.7%
Splenic pseudocyst	3	5.0%
Infarction	3	5.0%
Epithelial cyst of spleen	2	3.3%
Hamartoma	1	1.7%
Hematoma	1	1.7%
Lymphangioma	1	1.7%
Mesothelial cyst	1	1.7%
NHL- B cell type	1	1.7%
Abscess	2	3.3%
Total	60	100.0%

Discussion

Splenectomy in the present study was done as part of a diagnostic and therapeutic procedure. In the present study of the 60 cases, 36 were male and 24 were female patients with a male to female ratio of 1.66:1. The mean age is 35.96 years. The most common age group being 31-40 years with 18 (30.00%) cases. Choudhary et al. [9] reported the male to female ratio of 1.6:1 and 28 (43.07%) cases in the age group of 21-30 years. Adelusola et al. [10] reported a male to female ratio of 1.76:1, a mean age of 34.8 years, and the most common age group of 11-20 years and 21-30 years with 22 cases each. Namrata et al. [11] reported a male to female ratio of 1.4:1, and the most common age group of 21-30 years in 17 (25%) cases.

The most common indication of splenectomy in the present study is trauma (n=24, 40.00%), which includes road traffic accidents and blunt injury to the abdomen causing traumatic laceration of the spleen and hemorrhage. A similar most common indication of splenectomy was also reported by Gupta et al. [12] (n=55 cases, 65.80%), Namrata et al. [11] (n=22 cases, 32.35%), and Choudhary et al. [9] (n=41 cases, 63.00%). Sarangthem et al. [13] reported the most common indication for splenectomy is for hematological conditions (n=10 cases, 50%) followed by road traffic accident-induced traumatic laceration of the spleen (n=9, 45.00%).

Chronic venous congestion was the second most common finding in 22 cases. For these cases, a hematological cause was the most common indication. For this, the indications were thalassemia intermedia (7 cases) (31.82%), hypersplenism (4 cases) (18.18%), portal hypertension (3 cases) (13.64%), portal obstruction (2 cases) (9.09%), ITP (2 cases) (9.09%), and pancreatic pseudocyst (1 case) (4.55%). Gupta et al. [12] reported congestive splenomegaly in 9 (10.5%) cases which are due to portal hypertension secondary to liver cirrhosis. Sarangthem et al. [13] reported the most common indication for splenectomy was hematological conditions (10 cases, 50%) with 8 cases of thalassemia, 1 case each of ITP, and 1 case of autoimmune hemolytic anemia. Choudhary et al. [9] reported the most common cause for congestive splenomegaly (7 cases, 10.7%) was due to portal hypertension secondary to liver cirrhosis. In the present study, 5 cases had portal system pathology with portal hypertension (3 cases) (13.64%), and portal obstruction (2 cases) (9.09%), which showed congestive splenomegaly of the spleen. Namrata et al. [11] reported portal system pathology in 19 cases (27.94%, 11 cases with portal hypertension and 8 cases without portal hypertension) presenting with features of hypersplenism.

Splenectomy was done with an indication of a cyst in 6 cases. On pathological evaluation, half of them (n=3, 50%) were pseudocysts, one case of a mesothelial cyst, and two cases of an epithelial cyst. Namrata et al. [11] reported the indication for splenectomy was a hydatid cyst in 2 (2.90%) cases, and on pathological examination, one was an epithelial cyst and the other was a hydatid cyst. Gupta et al. [12] and Choudhary et al. [9] reported one case of each (1.2% and 1.5%) of hydatid cyst. Overall, the incidence of cysts was low (10.00%) which was in comparison to other studies.

Splenic infarction was seen in 3 cases (5%). Splenic infarction was diagnosed clinically in 1 case. Of the 2 cases, one case was hypersplenism and the other case was a splenic abscess clinically. Gupta et al. [12] reported splenic infarction in 3 (3.50%) cases, Namrata et al. [11] reported 3 (4.4%) cases of splenic infarction, and Choudhary et al. [9] in 2 (3%) cases.

A splenic abscess was seen in 2 (3.33%) cases, which were diagnosed clinically. Jagdev S et al. [14] reported splenic abscess in 1 (3.22%) case, Choudhary et al. [9] in 2 (3%) cases, and Namrata et al. [11] reported in 10 (14.70%) cases.

There was one case of splenic Non-Hodgkin's lymphoma and 1 case of hamartoma. Namrata et al. [11] reported 2 (2.90%) cases of non-Hodgkin's lymphoma and 1 (1.47%) case of hamartoma.

Conclusion

Splenectomy is a surgical procedure that can be used for both diagnostic and therapeutic purposes; the majority of cases in this study were indicated for therapeutic purposes. The most frequent reason for splenectomy specimens in this retrospective investigation was traumatic injury, which was followed by chronic venous congestion due to hemolytic anemias and portal hypertension. The study also included a few uncommon occurrences, including hamartomas and lymphangiomas. The study also includes the histopathological examination in cystic lesions which were not accurately diagnosed preoperatively. The study also highlights the changes in the spleen noted in the pathology of portal veins. Clinicopathological discrepancies in this study necessitate further preoperative evaluation to narrow down the diagnosis and hence better management.

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